

(12) UK Patent Application (19) GB (11) 2 125 382 A

- (21) Application No 8318955
- (22) Date of filing 13 Jul 1983
- (30) Priority data
- (31) 8220337
- (32) 13 Jul 1982
- (33) United Kingdom (GB)
- (43) Application published 7 Mar 1984
- (51) INT CL³
B65D 55/06
- (52) Domestic classification
B8T 13A TC
U1S 1074 1376 1449 B8T
- (56) Documents cited
GBA 2096114
GBA 2059928
GB 1265477
GB 1021712
- (58) Field of search
B8T
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(54) Tamper evident closure

(57) A tamper evident closure is in the form of a screw cap having a ring (6) attached to the lower rim of the skirt (4) of the cap (2), in which the ring (6) is in two parts (7, 8), the two parts (7, 8) being attached to one another by breakable webs (9). One part (7) is provided with teeth (12) to engage ratchet teeth (17) on the neck (16) of

the container (1) during rotation of the cap (2) during opening, and is attached to the cap (2) by easily breakable webs (10); the other part (8) has little or no interaction with the container (1) and is strongly attached to the cap, so that the first opening of the cap results in the breaking off and falling away of the first-mentioned part (7) of the ring (6), whose absence serves to indicate that tampering has taken place.

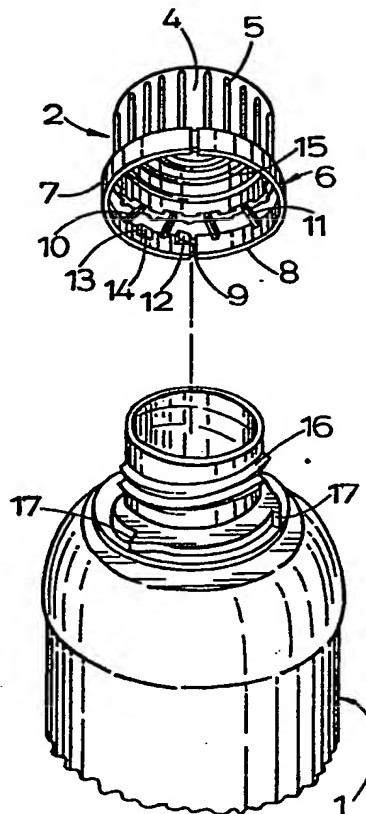


FIG. 2.

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

This print embodies corrections made under Section 117(1) of the Patents Act 1977.

SPECIFICATION

Tamper evident closure

This invention relates to tamper-evident closures for containers. The practice of providing closures with so-called tamper-proof strips or rings is widespread and has been adopted for a substantial proportion of the containers that are sold, not only for foodstuffs, but also for cleaning fluids, industrial products and in fact anything where it is desirable to indicate readily to the purchaser or user that the contents have not been interfered with from the moment of filling up to the moment he wishes to use them.

One well-known form, applied mainly to snap-on caps but sometimes to screw-threaded caps, involves a tear-off strip attached to the skirt of the cap and requiring to be removed by the user before the cap can be lifted off or unscrewed. This involves a separate operation additional to that of removing the cap, and a better arrangement, applied mainly to screw caps, is one in which there is a ring attached to the skirt of the cap by a weakened continuous web, or by separate circumferentially spaced webs, and arranged so that the act of removing the cap breaks the web or webs and leaves the ring behind.

The one drawback of this widely used last-mentioned arrangement is that, although breakage of the web or webs is a sure indication of tampering when spotted, it requires close inspection to reveal the breakage; the ring remains in place on the neck of the container and when the cap has been replaced, the webs at least come into engagement, so that at first glance it is by no means easy to see whether they are broken or not. Thus an ill-intentioned person, presented with access to a batch of sealed containers, could well carefully remove the cap of one of them and either tamper with or remove the contents, then replace the cap carefully, and the persons subsequently handling the batch are unlikely to spot that tampering has taken place.

The aim of the present invention is therefore to provide a tamper-evident arrangement in which the tampering really is evident i.e. at a glance, yet still without requiring a separate positive action by the user on authorised opening of the container.

According to the invention we provide a tamper evident closure comprising a cap having a top portion and a substantially cylindrical skirt depending therefrom, the skirt being joined to a ring, in which the ring is in two arcuate parts, joined by weakened portions of the ring, and one of the parts of the ring engages the neck of the container by abutment means that resist movement of that part when the cap is moved in an opening direction and is attached to the cap by one or more breakable webs, whilst the other part of the ring is attached to the cap relatively strongly and has relatively little or no interaction with the container.

The effect of this is that, when the cap is removed, the second-mentioned part of the ring comes away with the cap, whilst the first-

mentioned part breaks away from the cap and, as it is only an arc and not a complete ring, it will fall away freely. Thus, when the authorised user comes to inspect the container he can readily see that it has been tampered with by the obvious absence of a major part of the ring. Short of using adhesive to stick the detached part back into place, the ill-intentioned tamperer has no way of covering up his action.

Preferably, to ensure that it drops away freely, the first-mentioned part covers an arc of not significantly more than 180° , and conveniently each part is of equal semi-circular extent.

The invention can be applied both to screw caps and to push-on caps that require radial movement for their removal. It may be combined with child-resistant features that is say, provisions that make it difficult to remove the cap at all, even after the tamper-resistance has been broken, without taking some kind of action that is not readily apparent to a child.

Where the invention is applied to a screw cap the ring may be below and outside the skirt, preferably with one part of the ring joined to the lower edge of the skirt by easily breakable webs, whilst the other part is joined to the skirt by thicker webs or is an integral part of the cap; the two halves may be joined together by weakened webs, preferably defined by vertical grooves at two diametrically opposite comprising points of the ring. The first-mentioned half preferably has abutment means comprising ratchet teeth on its inside face to co-operate with outward-facing ratchet teeth on the neck of the container below the screw thread; the other half has no such abutment means.

When such a cap is first screwed into place, the ratchet teeth ride over one another in a known manner. When it is unscrewed, however, the faces of the ratchet teeth come into engagement, preventing the first half of the ring from moving more than a short distance, and so this half breaks away and, as there is nothing to hold it in place, it falls off. The other half remains with the cap but, if desired may be detached from it and thrown away by the user, and the closure may be replaced if he wants to use the container again.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, of which:—

Figure 1 is a side view of a container closed by means of a tamper evident closure according to the invention;

Figure 2 is a perspective view of a tamper evident closure according to the invention, prior to fitting onto a container adapted to receive such a closure; and

Figure 3 is a side view corresponding to *Figure 1* showing the closure having been removed from and subsequently replaced upon the container.

Figure 1 shows a tamper evident closure for a container 1 comprising a cap 2 having a top portion 3 from which depends a cylindrical skirt 4. The skirt 4 incorporates ribs 5 which provide a gripping surface in use. Attached to the skirt 4 by

means described below, and disposed mainly below the level of the skirt and radially outwardly thereof, is a ring 6 constituted by two arcuate parts 7, 8 joined by weakened portions 9 of the ring defined by vertical grooves at two diametrically opposite points of the ring.

From Figure 2, it may be seen that the ring 6 is attached to the cap 2 by a number of webs 10, 11. One part 7 of the ring is attached to the cap by thin, breakable webs 10 whereas the other part 8 of the ring is attached to the cap by means of relatively strong webs 11 which are not so easily broken. In addition, part 7 of the ring is provided with inwardly directed ratchet teeth 12, each tooth 12 having one abutment face 13 and one ramp face 14.

The cap 2 is internally screw-threaded at 15 for engagement with the neck 16 of the container 1. The container neck 16 is provided at a level below the screw threads with three ratchet teeth 17 for abutment with the ratchet teeth 12 of the ring when the cap is in or near its closed position. During rotation of the cap in the closing direction i.e. when the cap is first fitted to the container, the ratchet teeth 12 of the ring are able to ride over the teeth 17 of the container allowing the cap to assume a fully closed position. Upon rotation of the cap in the opening direction, however, the opposed teeth 12, 17 abut; if the opening movement is continued, the weakened portions 9 of the ring and the thin webs 10 attaching the part 7 of the ring to the cap 2 are broken and the part 7 falls away from the cap. The other part 8 of the ring, having no ratchet teeth, has little or no interaction with the container during rotation of the cap, and remains attached to the cap as shown in Figure 3. Figure 3 shows the closure having been subsequently replaced on the container, and it is readily seen by the obvious absence of a significant part 7 of the ring that tampering has taken place.

Clearly the webs retaining the part 8 of the ring to the cap need not be any thicker than those retaining the other part 7 if the interaction of the part 8 and the container 1 is sufficiently small. Alternatively the part 8 could be formed integrally with the cap, but attachment of the part 8 by means of webs enables the user manually to detach part 8 and discard it should he so wish.

50 CLAIMS

1. A tamper evident closure comprising a cap having a top portion and a substantially cylindrical skirt depending therefrom, the skirt being joined to a ring, in which the ring is in two arcuate parts joined by weakened portions of the ring, and one of the parts of the ring engages the neck of the

container by abutment means that resist movement of that part when the cap is moved in an opening direction and is attached to the cap by one or more breakable webs, whilst the other part of the ring is attached to the cap relatively strongly and has relatively little or no interaction with the container.

2. A tamper evident closure according to Claim 1 in which the first-mentioned part covers an arc of not significantly more than 180°.

3. A tamper evident closure according to Claim 1 or Claim 2 in which each part is of equal substantially semi-circular extent.

4. A tamper evident closure according to Claim 1 in which the closure is in the form of a screw cap in which the ring lies below and outside the skirt.

5. A tamper evident closure according to Claim 4 in which one part of the ring is joined to the lower edge of the skirt by easily breakable webs whilst the other part of the ring is joined to the skirt by thicker webs or is an integral part of the cap.

6. A tamper evident closure according to any preceding claim in which the weakened portions are defined by vertical grooves at two diametrically opposite points of the ring.

7. A tamper evident closure according to any preceding claim in which the abutment means of the first-mentioned part comprise ratchet teeth on the inside face of the first-mentioned part.

8. A tamper evident closure substantially as described with reference to, and as illustrated in, the accompanying drawings.

90 New claims or amendments to claims filed on 29 Sept. 1983

Superseded claim 1

New or amended claim:—

1. A tamper evident closure comprising a cap having a top portion and a substantially cylindrical skirt depending therefrom, the skirt being joined to a ring, in which the ring is in two arcuate parts joined by weakened portions of the ring, and one of the parts of the ring engages the neck of the container by abutment means that resist movement of that part when the cap is moved in an opening direction and is attached to the cap by one or more breakable webs, whilst the other part of the ring is attached to the cap relatively strongly and has relatively little or no interaction with the container, such that when the cap is removed the second-mentioned part of the ring comes away with the cap whilst the first-mentioned part breaks away from the cap and falls away freely.